UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/773,299	01/31/2001	Theodore A. Tantalo	82120DMW	6401

7590 06/07/2004

Patent Legal Staff
Eastman Kodak Company
343 State Street
Rochester, NY 14650-2201

EXAMINER	
YE, LIN	
ART UNIT	**PAPER NUMBER**
2612	3

DATE MAILED: 06/07/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/773,299	TANTALO ET AL.	
	Examiner	Art Unit	
	Lin Ye	2612	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *31 January 2001*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-15* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☒ Claim(s) *12-15* is/are allowed.

6)☒ Claim(s) *1-11* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *31 January 2001* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date 2.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. Claims 1-11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Chen 6,448,545 in view of Matteson et al. 4,345,825 and Nagaya et al. U.S. Patent 5,721,692.

Referring to claim 1, the Chen reference discloses in Figure 3, a method of adaptively determining the exposure time for compensate the motion of the object between image captures to reduce the smearing of images (See Col. 17, lines 9-14) by an image capture system of the type having an image sensor (imaging detector 46), optics (lens 27) for forming an image of a scene on the image sensor, and an image processor (PC 45) for determining an exposure time for the image sensor; comprising the steps: calculating object smear for the fastest moving object (ie., the moving object is moving very quickly comparing with background, such as a car traveling at 36 km/hour, see Col. 18, lines 1-11) based on the initial exposure time (i.e., initial exposure time 0.01 seconds, a smearing of about 100 pixels in every one of the pictures taken); if the object smear exceeds a maximum desired smear (i.e., the Ratio R>30 e/pix/col/pixels), allows to complete unsmearing procedures and if smaller R, (R<3 e/pix/col/pixel), the complete unsmearing is not reasonable (See Col. 20,

lines 29-40). However, the reference does not explicitly give a detail about the unsmearing procedures is strongly dependent upon exposure time, and setting the exposure time for a subsequent image frame to the new exposure time based on the object smear value.

The Matteson reference discloses in Figure 1 and 12, the SQF (smear) is a function of subject motion during exposure and as such is strongly dependent upon exposure time (See Col. 15, lines 20-25). In Figure 14, the reference states faster shutter speed (short exposure time) results in less smear. However, it falls off faster away from Vs due to the blurring of the background because of the larger aperture (See Col. 16, lines 8-18). In order to has maximizing the CQF (smear, blur) and an optimal overall quality of the picture, the image processor (camera exposure control system) chosen a desired aperture size and shutter time (See Col. 16, lines 18-35). The Matteson reference is evidence the one of ordinary skill in the art at the time to see more advantage for adjusting the exposure time and aperture size to find maximizing the CQF (smear, blur) so that the high quality images in each frame can be obtained. For that reason, it would have been obvious to see if the object smear exceeds a maximum desired smear, calculating a new exposure time; and setting the exposure time for a subsequent image frame to the new exposure time disclosed by Chen.

The Chen reference only mention the motion of the object is known by using the method that correspondence of a pixel in one image to a pixel in a subsequent image has been displaced by a known amount (See Col. 19, lines 36-40), but it does not explicitly show a detail steps how to obtain the speed of the moving object based measure spatial displacements from two image frames.

The Nagaya reference discloses in Figure 3, a method acquiring at least of two time-separated image frames during an initial exposure time set for each of the image frames (the frame images from time To to time Tn), wherein each image frame includes one or more moving objects (1052) from the scene; spatially registering the two image frames (spatial-temporal image 1050 contains both the temporal and spatial information, see Col. 7, lines 17); measuring spatial displacements between the two image frames for the same moving objects (1052); determining a fastest moving object (e.g., the moving object 1052 is a fastest moving object comparing rest of background which judged by background judgment means 700 as shown in Figure 1) in the scene from the measured spatial displacements (1050); and calculating a speed of the fastest moving object as shown in Figure 15 (e.g,. the principle for calculating the moving direction/velocity 1003 of the moving object 1101, see Col. 12, lines 57-67).). The Nagaya reference is evidence the one of ordinary skill in the art at the time to see more advantage spatially registering the two image frames and measuring spatial displacements between the two image frames for the moving object to accurately obtain the speed of the fast moving object in order to calculate the object smear with the initial exposure time. For that reason, it would have been obvious to see a detail steps how to obtain the speed of the moving object based measure spatial displacements from two image frames disclosed by Chen.

Referring to claim 2, the Chen, Matteson and Nagaya references disclose all subject matter as discussed with respected to same comment as with claim 1, and the Nagaya reference discloses spatially registering the two image frames (spatial-temporal image 1050) comprises generating a correlation matrix (distance σ = | background slit β- Current slit τ|)

from pixels in the two image frames in order to remove translation differences between the two image frames as shown in Figures 4 and 13 (see Col. 12, lines 11-22).

Referring to claim 3, the Chen, Matteson and Nagaya references disclose all subject matter as discussed with respected to same comment as with claim 1, the Nagaya reference discloses of measuring spatial displacements comprises the step of dividing one of the image frames into blocks and correlating each block (i.e. the slit image 1040 as block as shown in Figures 3-4) include with the other frame to detect the displacement of moving objects between the frames (See Figure 18 and 19).

Referring to claim 4, the Chen, Matteson and Nagaya references disclose all subject matter as discussed with respected to same comment as with claim 1, and the Matteson reference discloses setting an exposure time comprises selecting one of a predetermined set of exposure times from a database (memory 42, see Col. 6, lines 19-41).

Referring to claim 5, the Chen, Matteson and Nagaya references disclose all subject matter as discussed with respected to same comment as with claim 1, and the Matteson reference discloses wherein a mechanical shutter is used to control the exposure time (See Col. 7, lines 32-35).

Referring to claim 6, the Chen, Matteson and Nagaya references disclose all subject matter as discussed with respected to same comment as with claim 1.

Referring to claim 7, the Chen, Matteson and Nagaya references disclose all subject matter as discussed with respected to same comment as with claim 1.

Referring to claim 8, the Chen, Matteson and Nagaya references disclose all subject matter as discussed with respected to same comment as with claim 2.

Referring to claim 9, the Chen, Matteson and Nagaya references disclose all subject matter as discussed with respected to same comment as with claim 3.

Referring to claim 10, the Chen, Matteson and Nagaya references disclose all subject matter as discussed with respected to same comment as with claim 4.

Referring to claim 11, the Chen, Matteson and Nagaya references disclose all subject matter as discussed with respected to same comment as with claim 5.

Allowable Subject Matter

3. Claims 12-15 allowed.

4. The following is an examiner's statement of reasons for allowance:

The prior art does not teach or fairly suggest a method of adaptively determining the exposure time and frame rate for each frame of an image capture system of the type that acquires two image frames separated in time by a initial frame rate, wherein each image frame includes one or more moving objects from a scene, said computer program product comprising: a computer readable storage medium having a computer program stored thereon for performing the steps of: determining a fastest moving object in the scene from the measured spatial displacements; calculating a speed of the fastest moving object; calculating the object displacement based on the initial frame rate; and if the object displacement exceeds a maximum desired displacement, calculating a new frame rate.

Conclusion

5. Any inquiry concerning this communication or earlier communications from the examiner should be directed to **Lin Ye** whose telephone number is **(703) 305-3250**. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Wendy R Garber can be reached on (703) 305-4929.

Any response to this action should be mailed to:

Commissioner of Patents and Trademarks

Washington, DC. 20231

Or faxed to:

(703) 872-9306

Hand-delivered responses should be brought to Crystal Park II, 2121 Crystal drive, Arlington, VA., Sixth Floor (Receptionist).

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Technology Center 2600 Customer Service Office whose telephone number is (703) 306-0377.

WENDY R. GARBER
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2600

Lin Ye
May 27, 2004